

Red Planet Recycle- Supervisor meeting

Minutes

Tuesday 17th of January, 2012 at 14:00

Classroom 7

Group member's attending

Yassen Abbas (Y.A)

Jamie Cassels (J.C)

Malcolm Chambers (M.C)

Scott Clark (S.C)

Gareth Herron (G.H)

Sam Jones (S.J)

Dylan Martin (D.M)

Bo Peng (B.P)

Charlotte Raymond (C.R)

Samuel Walpole (S.W)

James Young (J.Y)

Lois Doig (L.D)

Supervisors attending

Dr Prashant Valluri & Dr Lev Sarkisov

Minutes

All members presented their key findings from the feasibility studies carried out over the winter break. The following are the key points, as well as recommendations and advice given by the supervisors:

- More substantive evidence is needed to establish whether or not waste water treatments involving microorganisms can survive the conditions on Mars. Before next week's meeting look for studies involving microorganisms on low gravity.
- From the membrane technologies, nanofiltration was found to be the most efficient however it was recommended to choose a technology which has been proven to work
- Electrocoagulation was cited as a possible technology however the issue of 'rods dissolving' needs further examination
- VPCRA is preferred over Direct Osmotic Concentration which is already an established technology on the ISS because the latter would require a resupply of salt
- It was suggested that the methane produced from 'anaerobic digestion' could be used in the Sabatier reaction to produce pure water.
- The Sabatier reaction was highlighted as the most feasible of the air recycling technologies. The Bosch reaction however was ruled out due to its catalytic lifespan and cleaning requirements.

The following are recommendations of what needs to be addressed for next week's meeting:

- A change of focus from technologies which produce oxygen too how to capture CO₂.
- Need to have a systematic approach for next week, outlining the design objectives, constraints and the criterion. When these are established certain technologies can be ruled out where others can be taken forward.
- Need to start with a simple chemical engineering box, with 'in' and 'out' specified i.e. what is the composition of water coming into the system and what is the requirement of water coming out (and air).
- Need to include, mechanical, chemical and feedstock constraints. Technology has to be simple/modular and If possible, either proven on the ISS or experimentation which shows it can be feasible in the Mars environment.
- Technologies which have already been tried and tested by NASA and other space agencies can be taken forward. Simply put, It is both a confirmation of our findings where we could build on their work

Other points from the meeting

- Lester will visit Edinburgh University on the 2nd of February. A meeting with him will be organised in due course.
- There will be a meeting during 'Innovative learning week' at the allotted time

Group members will meet at 10 am on the 18/01/2012 at Jcmb, Floor 03, Room 3.3216 to formulate design objectives, criterion and constraints.

Yassen Abbas will be chairman for the 24th of January meeting

James Young will be Secretary for the 24th of January Meeting